

Date: Friday, 13/03/2009 4:50:23 PM
 User: Julie Dawson

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : 350/355 AS X-TUBE FWD
 Job Number : 46484
 Estimate Number : 12485
 P.O. Number :
 This Issue : 13/03/2009 S.O. No. :
 Prsht Rev. : NC Part Number : D350748101
 First Issue : / / Type : CROSSTUBES Drawing Number : N/A
 Previous Run : 45348 Drawing Revision : D
 Material :
 Due Date : 20/04/2009 Qty: 1 Um: Each

Written By :

Checked & Approved By :

Comment :

Est Rev:A New Issue 06-07-05 JLM
 Est Rev:B Update qty of MS21042L5 06-09-12 KJ
 Est Rev:C Rev B 07-11-15 DD
 Est Rev D Combined manufacturing 08.04.02 EC verified by:
 DD
 Est Rev:E 08-06-24 revD as per dwg DD verified by:EC

Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

DC

DOCUMENT CONTROL



Handwritten: JLD 09/04/30



Comment: Photocopy bluefile & type labels per PPPD350-748-101 CHG001

Handwritten: 5 09/06/10

2.0

D350748141TRN

Crosstube Turning Detail



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch B45367

Handwritten: DD

Handwritten: 9-4-16

3.0

BENDING

BENDING MACHINE - SKIDTUBES



Comment: BENDING MACHINE

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

Handwritten: DD 9-4-16

4.0

QC15

DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES

Handwritten: PTD 09.05.04

5.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,

Set-up drill table as per QSI 010

Handwritten: } 25 09.05.04

2-Deburr

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D350-748-101 PAR #: _____ Fault Category: _____ NCR: Yes (No) DQA: D Date: 09/06/11
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR: <u>46484</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
09.05.04	3	Tube bent high	<u>CP</u> 09.05.04 <u>PC</u> 05/042	Cut 023.37 Acceptable	<u>AB</u> 09-05-06	<u>S</u> 09/05/06	<u>CP</u> 05.05.04 <u>PC</u> 05/042	<u>S</u> 09/05/06

NOTE: Date & initial all entries

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Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 46484

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

3-Engrave Part # and Batch # as per Dwg D350-748-141

RT 09-05-04

4-Remove all marks from tube within limits of D350-748-141

M 9-5-5

5- Apply a light coat of LPS3 on the interior of tube

Batch:

109956

AWM

9-5-6

6.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

CHECK 10 DEG HOLES WITH DT8876E(EUROCOPTER CLAMP)

509/05/06 (10)

7.0

OUTSIDE SERV.11

OUTSIDE SERVICE -CROSSTUBES



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: 8753

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

CD 09/05/07
(1)

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

PC 9/05/02 (1)

9.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

209.06.03 (1)

10.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside crosstube as per QSI 005 4.2

2-Prime Outside of Tube as per Dart QSI 005 4.2

RT 09-06-04

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 46484

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

11.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

12.0

D35021

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

SUPPORT

Batch: 41603

RT 09-06-08

13.0

D2856400

Abrasion Strip



Comment: Qty.: 1.2401 f(s)/Unit Total: 1.2401 f(s)

Abrasion Strip 7.10" long x2

Batch: 42437

RT 09-06-08

14.0

ALS41032225

Insert



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Insert

Batch: 107441

RT 09-06-08

15.0

AN960JD10

Washer



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Washer

Batch: 105442

RT 09-06-08

16.0

MS2192020

Clamp (per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Clamp (per MIL-DTL-8783C)

Batch: 110536

RT 09-06-08

17.0

MS27039110

Screw



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Screw

Batch: 111425

RT 09-06-08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

18.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Install Ground wire Insert, then insert screw and washer

2-Install Abrasion strips as per Dwg D350-748-141 & QSI 035.

3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS

09-06-08

19.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

09-06-08

20.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

21.0

D35001

Saddle



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

350 SADDLE

Batch: 45346

09-06-09

22.0

D35011

Bushing



Comment: Qty.: 16.0000 Each(s)/Unit Total: 16.0000 Each(s)

BUSHING

Batch: B44637

09-06-09

23.0

AN46A

Bolt



Comment: Qty.: 16.0000 Each(s)/Unit Total: 16.0000 Each(s)

Bolt

Batch: M110399

09-06-09

24.0

AN441A

bolt



Comment: Qty.: 8.0000 Each(s)/Unit Total: 8.0000 Each(s)

bolt

Batch: M110363

09-06-09

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Job Number: 46484

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

AN532A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Batch: M110363

26.0

AN960JD416

Washer



Comment: Qty.: 32.0000 Each(s)/Unit Total : 32.0000 Each(s)

Washer

Batch: M111279

27.0

AN960JD516

Washer



Comment: Qty.: 8.0000 Each(s)/Unit Total : 8.0000 Each(s)

Washer

Batch: M111279

28.0

MS21042L4

Nut



Comment: Qty.: 24.0000 Each(s)/Unit Total : 24.0000 Each(s)

Nut

Batch: M110507

29.0

MS21042L5

Nut



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Nut

Batch: M111127

30.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

31.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D350-748-101

Location:

PPP Rev: B

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Drawing Name: 350/355 AS X-TUBE FWD

Job Number: 46484

Part Number: D350748101

Job Number:



Seq. #:

Machine Or Operation:

Description :

32.0

QC21

FINAL INSPECTION/W/O RELEASE



09/06/11 J

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



MF
09-06-11

46484

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

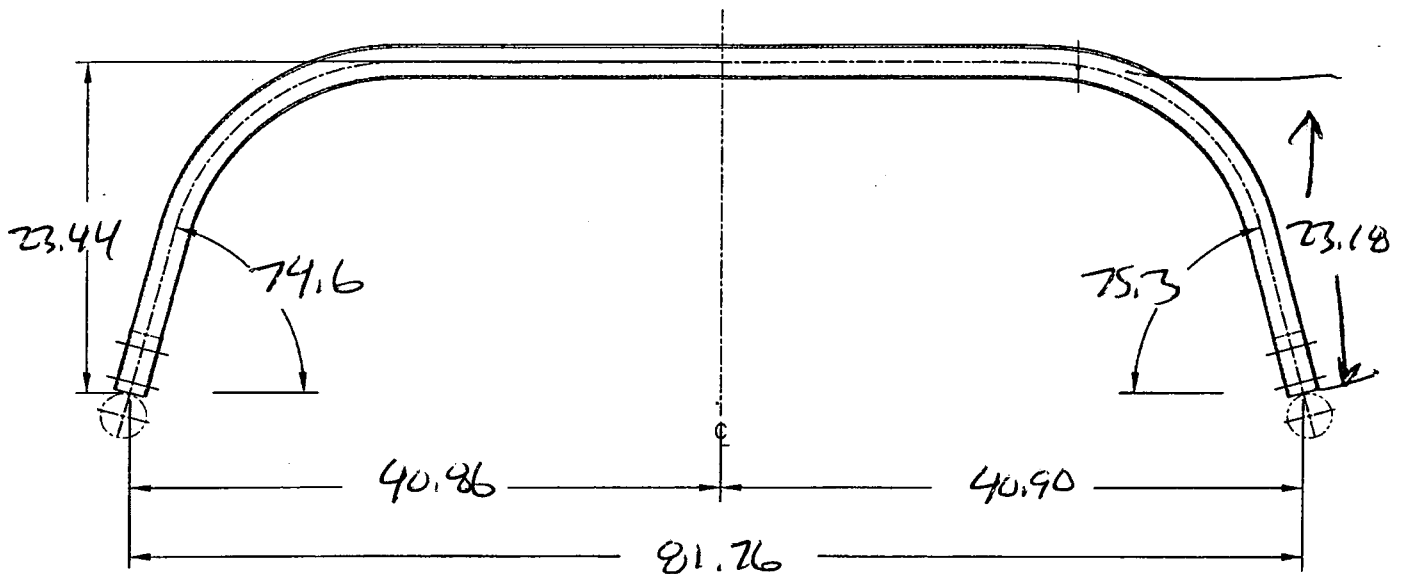
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			


NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	46484
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1	


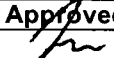
Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Twist deflection = 0.590
Cut tube @ 23.37" High - Acceptable.

QC15 Inspection	
Date	

09.05.04

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM 	



DESIGN <i>qp</i>	DRAWN BY <i>qp</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>HA</i>	APPROVED <i>HA</i>	DRAWING NO. D350-748-141	REV. D SHEET 1 OF 3
DATE 06.10.31		TITLE CROSSTUBE (AS 350/355 HI FWD) NTS	
A	06.03.31	NEW ISSUE	
B	06.06.30	ADD D6017-115 & PRIME AND PAINT	
C	06.08.14	ADD CAD PLATING	
D	06.10.31	MAG. PARTICLE AND CAD PLATE AS MFD.	

RELEASED
06.10.31 *HA*

QTY	P/N	DESCRIPTION
X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	D6017-115	CROSSTUBE (OR D6015-125)
2	D3502-1	SUPPORT
2	D2856-400-710	ABRASION STRIP
1	AELS-1032-225	INSERT
1	AN960JD10	WASHER
2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
1	MS27039-1-10	SCREW

UNDER REVIEW

09.02.05
PER PCR #09.001

D350-748-141 CROSSTUBE:

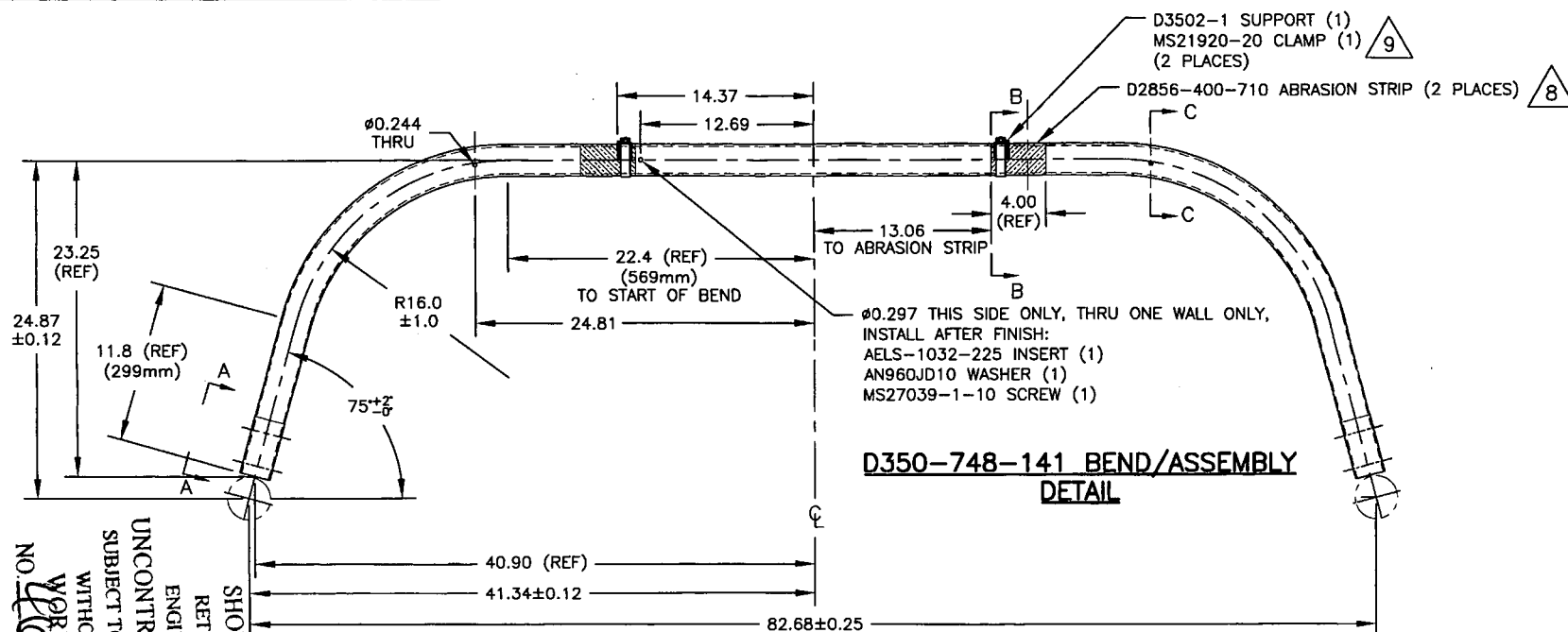
- MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
FINISHED LENGTH = 110.27±0.06
- MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. ORDER
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING
HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO
ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- ALL DIMENSIONS ARE IN INCHES
- PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

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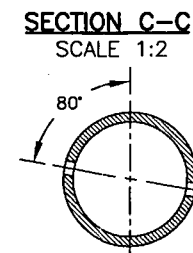
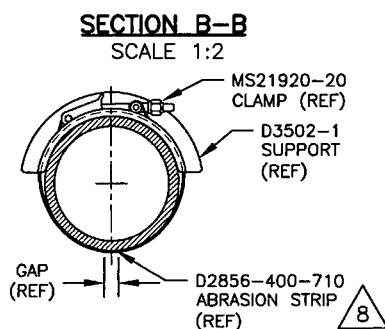
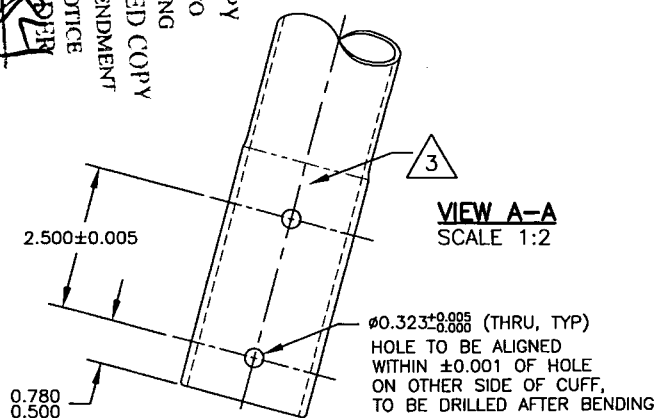
OK 07.10.02

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UNDER REVIEW
09.02.05

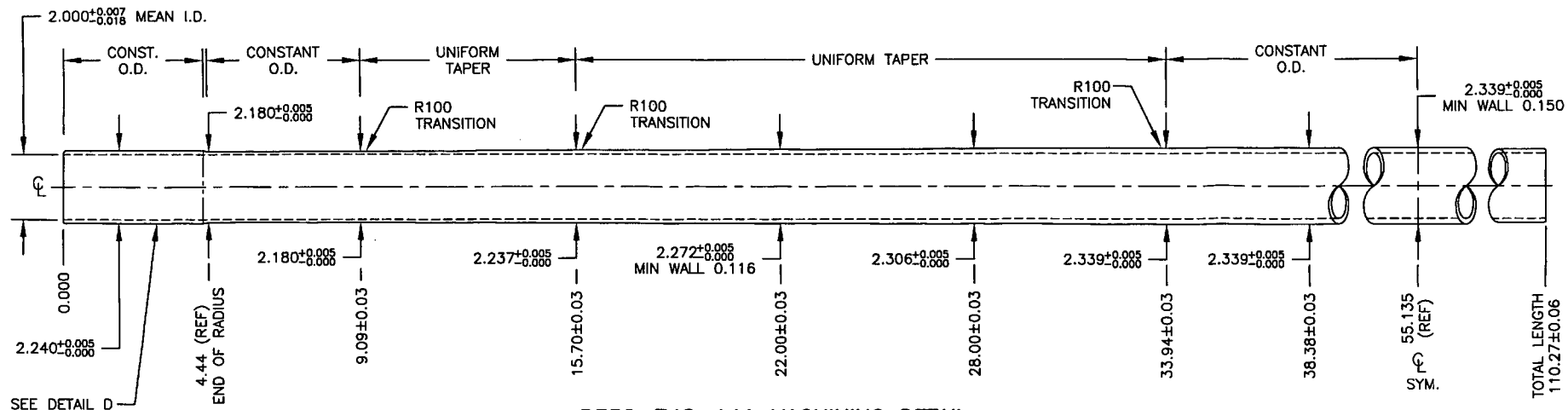
UNDER REVIEW
02.16
OK 07.10.22

RELEASED
06.10.31

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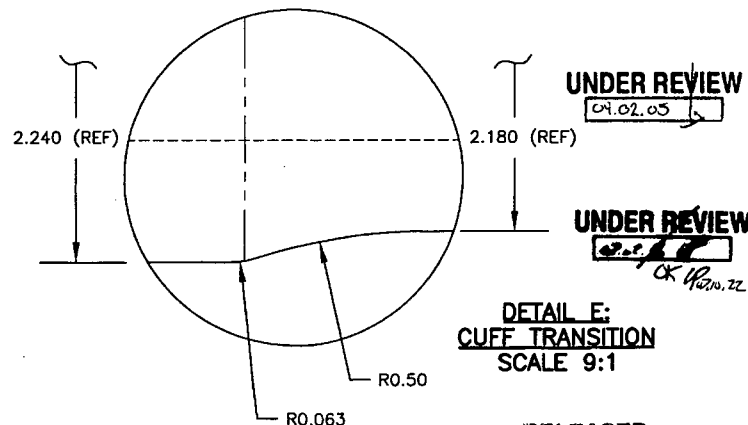
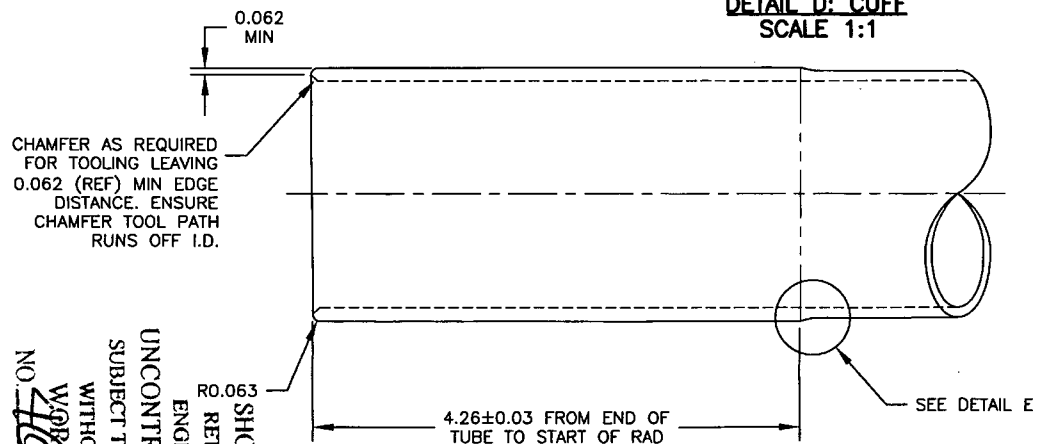
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DESIGN	q	DRAWN BY	q	DART	DART AEROSPACE LTD. HAMPSHIRE, ONTARIO, CANADA
CHECKED	#	APPROVED	#	DRAWING NO.	REV. D
DATE	06.10.31	TITLE	CROSSTUBE (AS 350/355 HI FWD)	D350-748-141	SHEET 2 OF 3
		SCALE	1:8		



D350-748-141 MACHINING DETAIL

**DETAIL D: CUFF
SCALE 1:1**



UNDER REVIEW
09.02.05

UNDER REVIEW
09.02.05

**DETAIL E:
CUFF TRANSITION
SCALE 9:1**

RELEASED
06.10.31

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DESIGN qp	DRAWN BY qp	DART	DART AEROSPACE LTD. HAMPSHIRE, ENGLAND, GBR
CHECKED #	APPROVED #	DRAWING NO. D350-748-141	REV. D SHEET 3 OF 3
DATE 06.10.31	TITLE CROSSTUBE (AS 350/355 HI FWD)	SCALE 1:3	

NO. 40487
WORK ORDER
WITHOUT NOTICE
SUBJECT TO AMENDMENT
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**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: May-29-2009

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 86473

INVOICE #: 44584

**CONTRACT OR
PURCHASE ORDER #** PO00008753

DESCRIPTION: SKID

QTY 1

P/N # d350-748-101 ✓

S/N # B46484

**STRESS RELIEF BAKE @ 375 FOR 5 HRS HEAT CHART #10447. MPI
INSPECTED IAW ASTM-E-1444. CADMIUM PLATED IAW AMS-QQ-P-
416B, TYPE 2 YELLOW, CLASS 2. BAKE HEAT CHART #10508.**

**CERTIFICATE: I certify that the items indicated here on have
been inspected and tested and conform to all specifications
and requirements detailed on the contract or purchase order.**

Approved Inspector:



A large, stylized handwritten signature in black ink.